

Factsheet - Health risk assessment for cyanobacterial toxins in seafood from the Gippsland Lakes

health

Summary of the report from a Scientific Advisory Group

Gippsland Lakes - Victoria

Blue-green algal (cyanobacterial) blooms are a common occurrence in the Gippsland Lakes with major blooms occurring in recent years. Different factors such as nutrients, temperature and flow influence the ability of blue-green algal blooms to develop. Blue-green algae are a public health concern because some species are able to produce toxins which are harmful to humans and other animals. *Nodularia spumigena* which produces the hepatotoxin nodularin – which can have harmful effects on the liver - has bloomed previously in the Gippsland Lakes. Sporadic blooms of non-toxin producing *Synechococcus* and toxin producing *Anabaena circinalis* and *Microcystis aeruginosa* have also occurred in the Gippsland Lakes. *Anabaena circinalis* produces saxitoxins, which affect the nervous system, while *Microcystis aeruginosa* produces microcystins which, like nodularin, can have harmful effects on the liver.

Toxins can bioaccumulate in aquatic organisms such as shellfish, prawns and fish. Many aquatic organisms accumulate toxins and transfer them along the food chain¹. Therefore it is possible that during a prolonged bloom, the concentration of cyanobacterial toxins in seafood can reach levels at which human consumption should be discouraged.

Why have health guideline values been developed?

The Gippsland Lakes are the only large inland water bodies in Victoria with both commercial and recreational fishing. Commercial inshore, offshore and shelf fisheries exist in the Gippsland Lakes and health guideline values have been developed for blue-green algal toxins in 'seafood' to provide a sound scientific basis for decisions on risks to public health from seafood consumption. These guideline values ensure that public health is protected, and also serve to minimise the disruption to the commercial fishing and tourism industries, by identifying levels of blue-green algae toxins which can be tolerated in 'seafood' to be consumed by humans.

Previous health guideline values

In 2001 the Department of Health was responsible for seafood safety under the *Food Act 1984*. Health guideline values were developed based on cell counts in water as well as levels of toxin in seafood. The derived health guideline values were subsequently used to restrict commercial harvesting and sale of 'seafood' from the Gippsland Lakes.

Review of the health guideline values by a Scientific Advisory Group

Since 2001, the *Seafood Safety Act 2003* was enacted and PrimeSafe has become the statutory authority which administers the Seafood Safety Act. The Chief Health Officer of the Department of Health provides advice to PrimeSafe in relation to potential risks to public health.

Due to the publication of new blue-green algae research and seafood consumption data since 2001, a Scientific Advisory Group was formed to review the existing health guideline values.

Leading experts in blue-green algae research, human health risk assessment, toxicology and water quality were represented on the Scientific Advisory Group.

¹ Meriluoto, J.A.O and L, Spoof. Cyanotoxins: sampling, sample processing and toxin uptake, in Cyanobacterial harmful algal bloom: state of science and research needs.

Risk assessment methodology:

The Scientific Advisory Group used the standard human health risk assessment approach in the risk assessment which includes:

1. Hazard identification – determine the potential of the toxins to cause harmful effects in humans
2. Dose response assessment – examine the quantitative relationship between the toxins at different exposure levels and the incidence of harmful effects in humans or animals
3. Exposure assessment – determine the route, frequency and duration of the exposure, including the nature of exposed populations
4. Risk characterisation – integrate toxin presence, dose-response and exposure assessment information.

How were the health guideline values derived?

In order to derive the health guideline values, the following steps were taken:

1. Determine the Tolerable Daily Intake (TDI) for each toxin
2. Determine the acceptable limit of toxin consumption per person per day
3. Define a high level intake of seafood per customer per day
4. Derive a health guideline level for toxin in seafood.

Guideline summary

The following health guideline values were derived as summarised in Table 1:

Table 1: Health guideline values for cyanobacterial toxins in seafood from the Gippsland Lakes

Toxin	Health guideline values for cyanobacterial toxins in seafood from the Gippsland Lakes (µg/kg of whole organism sample)		
	Fish	Prawns	Mussels or Molluscs
Cylindrospermopsin and deoxyCYN	18	24	39
Microcystin-LR or equivalent toxins, i.e. Nodularin	24	32	51
Saxitoxins	800	800	800

Management of blue-green algal blooms in the Gippsland Lakes

The Department of Sustainability and Environment (DSE) is the convening agency for blue-green algal blooms in the Gippsland Lakes. In the event of a blue-green algal bloom in the Lakes, DSE convenes an Incident Management Team to assist in the management of the bloom. The Incident Management Team includes multiple agencies and representatives from DSE, the Department of Primary Industries, the Department of Health, EPA Victoria, the Gippsland Coastal Board, Parks Victoria, Southern Rural Water, East Gippsland Shire Council, Wellington Shire Council and other key stakeholders.

Further information

For further information on the health risk assessment, please contact the Department of Health's Environmental Health Unit on 1300 761 874.

For further information on the management of blue-green algal blooms in the Gippsland Lakes, please contact the Department of Sustainability and Environment's Gippsland Office on (03) 5152 0420.

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